

CTENOSTREON PECTINIFORMIS, SCHLOTHEIM, AN
AUSTRALIAN FOSSIL.

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(Plate iii.)

IN 1870, the late Mr. Charles Moore, of Bath, England, recorded¹ as a West Australian Oolitic species, *Lima proboscidea*, Sby., but he neither described nor figured the shell. Less than three years previously, the late Rev. W. B. Clarke did the same from information supplied him by Mr. Moore.² As it is important that all species common to the stratified deposits of this Continent and other parts of the world should be accurately figured, quite as much as those purely endemic, for the information of Australian students of Geology, I take the opportunity in the present instance of effecting this through examples of this shell having passed into the possession of the Trustees.

The species was known to the older writers under two names—*Lima pectiniformis*, described by Von Schlotheim in 1820, and *Lima proboscidea*, by J. Sowerby in 1821, the latter therefore becomes a synonym of the former.³ It also forms the second described species of Eichwald's genus *Ctenostreon*.⁴

Eichwald very carefully and lucidly explains that *Ctenostreon* unites the characters of the genera *Ostrea*, *Pecten*, *Lima*, and *Spondylus*. The more or less inflated shell is lamellar, as in *Ostrea* and *Lima*, more or less irregular in growth as in both the genera just mentioned, but the costæ are more uniform than those of the Oyster. The valves are nearly equal, as in *Lima*, with large auricles as in *Pecten*, and the costæ are furnished with fistulose spines similar to those of *Spondylus*. The shell was not self-attached as in *Ostrea*, but like that of *Pecten* fixed by a byssus.

The principal synonymy of the species is as follows:—

¹ Quart. Journ. Geol. Soc., xxvi., 1870, pp. 231 and 232.

² Quart. Journ. Geol. Soc., xxiii., 1867, p. 8.

³ Bronn—Index Pal., Nomen., 1848, p. 647.

⁴ Eichwald—Lethæa Rossica, ii., 1868, p. 455.

CTENOSTREON PECTINIFORMIS, *Schlotheim*, sp.

(Plate iii.)

- Ostracites pectiniformis*, Schlotheim, Petrefactenkunde, i., 1820, p. 231.
- Lima proboscidea*, J. Sby., Min. Con. Gt. Brit., iii., 1821, p. 115, pl. cclxiv.
- „ *proboscidea*, Goldfuss, Petrefacta Germaniæ, ii., 1836, p. 88, pl. ciii, fig. 2.
- „ *pectiniformis*, Bronn., Index Pal., Nomen., 1848, p. 647.
- „ *pectiniformis*, Bronn., Lethæa Geognostica, 3rd edit., ii., Theil 4, 1851, p. 214, pl. xix., figs. 9 and 10, 10a and b (for full synonymy).
- „ *pectiniformis*, Morris & Lycett, Moll. Gt. Oolite (Pal. Soc.), pt. 2, 1853, p. 26, pl. vi., fig. 9.
- „ *proboscidea*, Clarke, Quart. Journ. Geol. Soc., xxiii., 1867, p. 8.
- Ctenostreon proboscideum*, Eichwald, Lethæa Rossica, ii., 1., 1868, p. 457.
- Lima proboscidea*, Moore, Quart. Journ. Geol. Soc., xxvi., 1870, pp. 231 and 232.
- „ *proboscidea*, Eth. fil., Cat. Austr. Foss., 1878, p. 109.

Obs.—There are two right valves in our Collection, the largest is four and a half inches across both diameters, and the other is but slightly less, four inches by four and a half. The specimen figured (Pl. iii.) is the better of the two, and from it the following facts are chiefly gained :—

The valve is suborbicular, decidedly inequilateral, only moderately convex, and with a short cardinal margin, but not shorter in proportion than that figured by Morris and Lycett from the Great Oolite of Minchinhampton. The anterior auricle is practically undeveloped, and the anterior margin oblique to the cardinal margin. The posterior auricle is triangular and comparatively small, separated from the body of the valve by a well marked groove; the posterior end as it approaches the margin is somewhat flattened. The posterior margin is oblique, but not emarginate. There are nine well developed costæ and an indication of a short tenth, sharp and ridge-like, rising into nodose, fistulous projections, or short tubes, at the intersections of the costæ by the concentric lamellæ, which vary much in their distance apart in the two specimens—wide apart in one, moderately close in the other. The fistulous spines project beyond the ventral margin, which is regularly rounded. The intercostal spaces are wide and concave in the centre of the valve, becoming flatter towards

the lateral margins, and the concentric lamellæ continue longitudinally across the posterior auricle, but the latter is destitute of costæ.

Internally there is a well marked and broad area, traversed by delicate cartilage grooves, and divided medianally by a wide chondrophore, which, slightly canted to the posterior, projects below the lower margin of the area. The former is subconcentrically grooved, but the grooves are coarser than those on the area proper. The margins, anterior and posterior, as far as the transverse median line of the valve are lamellar scobinate. Beneath the somewhat projecting ventral end of the chondrophore, and a little anterior to the latter, is a shallow hepatic fossa. The adductor impression is moderately large, longitudinally oval, and impressed on its posterior side, so that in casts of the interior, a semi-oval ridge would be left.

There appears to be a large amount of variability in the number of costæ decorating the exterior of *Ctenostreon pectiniformis*. Goldfuss figures a wide shell with fourteen highly fistulous costæ; Bronn a medium sized mollusc with eleven, and an abnormal, long, narrow individual with equal pectinoid auricles, possessing six costæ. The shell figured by Morris and Lycett has ten costæ; and, as previously stated, the West Australian specimen now under description exhibits nine normal and well developed ribs. An example from Olschingen, in our Collection, possesses eight costæ, and another from Neuhausen twelve.

A similar variability exists in the form of the valves, and the extent to which the auricles are developed. In the present example, and in one from an unknown German locality, the anterior auricle is entirely wanting; in a second individual from the latter place there is a slight anterior auricle; whilst in the shell so beautifully illustrated by Goldfuss, and in Morris and Lycett's Great Oolite specimen both auricles are well grown.

The chondrophore varies in longitudinal diameter, but its posterior obliquity seems to be fairly constant in all that have come under my notice. The chondrophore of the recent *Malleus malleus*, Linn., is precisely similar to that of the present shell, both as to form, direction, and extension below the cardinal area. That of *Meleagrina margaritifera* is on the same plan, but much more transversely drawn out.

The adductor impression is also a variable feature, longitudinally oval or round, and in two out of three valves now before me, deepest on the posterior side.

The hepatic fossa, although constant in all the specimens examined, is neither large nor deep. I use this name to distinguish the pit so generally found penetrating the umbonal cavity of both valves, or only the right valves of aviculoid shells. Amongst

living forms it is practically reduced to nothing in *Melina cumingi*, and other species of that genus; absent in *Pinna*; present in both valves of *Pteria prasei*, Dunker; visible in the right valve of *Pteria morio*, Leach, and in both valves of *Pteria cumingi*, Reeve. The fossa is not developed in *Meleagrina margaritifera*, Linn.; but to some extent in the right valve, at least, of *M. citrina*, Dunker. It is not to be found either in *Malleus* or *Ostrea*.

Closely allied to *C. pectiniformis* externally, is *Lima substriata* (Munster) Goldfuss,⁵ and not unlike our shell either. *Lima tuberculata*, Terquem,⁶ also possesses a general resemblance.

Loc.—Hills on the Cue Railway, thirteen and a quarter miles north-east of Geraldton, Western Australia (presented by Mr. A. Gibb-Maitland, Government Geologist of Western Australia); and Geraldton District⁷ (presented by Miss Fitzgerald).

⁵ Goldfuss—Petrefacta Germaniæ, ii., 1836, pl. ciii, figs. 1, 1a and b.

⁶ Dumortier—Études Pal. Dépôts Jurassiques Bassin Rbone, 1., 1864, p. 56, pl. viii., figs. 3-5.

⁷ Precise locality unknown.